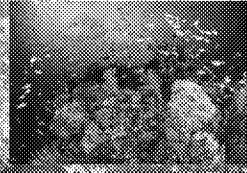
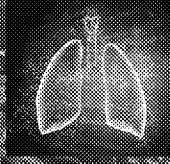
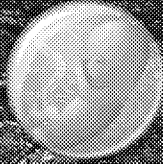
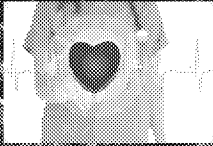


Office of Research and Development

## *Human Health Risk Assessment Research Program*



HHRA Research Program Highlights Briefing: FY17 Q3  
May 9, 2017

Tina Bahadori, National Program Director (NPD)





## Today's Topics



- **Welcome and HHRA Transitions**
- **Science Spotlight: Dr. Tara Greaver (NCEA-RTP) "*The Ecological Impacts of NO<sub>x</sub>/SO<sub>x</sub>/PM characterized in the draft Integrated Science Assessment (ISA)*"**
- **Project progress reports and PACT Status**
- **Partner feedback**

# **Integrated Science Assessment for Oxides of Nitrogen, Oxides of Sulfur, and Particulate Matter – Ecological Criteria**

INSERT OTHER SLIDES ONCE CLEARANCE COMPLETED

HHRA Highlight Briefing  
Presented by Tara Greaver ORD/NCEA/NCEA-RTP  
May 9, 2017



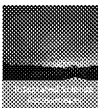
## 4 Topics and 9 HHRA Projects: Responding to Partner Priorities



Integrated Risk  
Information Systems

..... #1) IRIS Assessments

..... #2) IRIS Update



..... #3) Integrated Science Assessments (ISAs) and Scientific/Regulatory Support



..... #4) Provisional Peer-reviewed Toxicity Value (PPRTV) Assessments

..... #5) Site-specific and Superfund Regulatory Support

..... #6) Cumulative Risk Assessment Methods and Applications



..... #7) Advancing Hazard Characterization and Dose-response Methods and Models

..... #8) Applying Emerging Science to Inform Risk Screening and Assessment

..... #9) Risk Assessment Support and Training



**Project 1 & 2 (HHRA 1.21 and 1.22):  
Integrated Risk Information System (IRIS) Assessments**

HHRA FY17 Q3 May 9, 2017

Kris Thayer, PhD  
Director, IRIS Division  
National Center for Environmental Assessment  
US EPA Office of Research and Development



## IRIS Assessment Updates

Scoping and Problem Formulation	Step 1: Draft Development	Step 2: Agency Review	Step 3: Interagency Review	Step 4a: Public Comment/	Step 4b: External Peer Review	Step 5: Revise Assessment	Step 6: Final Agency/ Interagency Review
<b>Nitrate/Nitrite</b> (IRIS Assessment Plan for SAB Review in September 2017)	HBCD (Undergoing Internal Review)	Formaldehyde (Anticipated Summer 2017)			RDX (Awaiting Final Peer Review Report)		
<b>Mercury/methylmercury</b> (IRIS Assessment Plan for SAB Review in September 2017)	Chromium VI  Naphthalene  PCBs noncancer	Inorganic arsenic (Anticipated Summer-Fall 2017)			ETBE (Anticipated June 2017 for SAB meeting in August 2017)		
<b>Ethylbenzene</b> (IRIS Assessment Plan for SAB Review in September 2017)	PAH mixtures  Phthalates (DINP, DBP, BBP)	Multi-Phthalate Epi (Anticipated Fall 2017)  DIBP, DEP (Anticipated Fall 2017)			TBA (Anticipated June 2017 for SAB meeting in August 2017)		

Thayer HHRA IRIS Update (May 9, 2017)

- \* NCEA scientists who work within the IRIS Program
- \* 70+ staff attended the 3 days retreat at Potomac Yard
- \* Discussed ongoing changes to the IRIS Program
- \* Agenda topics included:
  - Operationalizing and harmonizing practices and workflows to implement IRIS Handbook
  - Application of systematic review software tools to enhance efficiency and transparency
  - Activity sessions to develop systematic review draft assessment plans, learn a software application, and improve writing skills for evidence synthesis narratives



## Communities of Practice for Systematic Review

- Established March 2017
- Four orientation/survey meetings held in March-April
- Aiming for 1 meeting a month to promote communication, harmonization, and methodology advancements

Thayer HHRA IRIS Update (May 9, 2017)



- \* Provided input on guidance and scoping documents due for public release in June
  - Guidance to Assist Interested Parties in Developing and Submitting Draft Risk Evaluations
  - Strategy for Conducting Scoping-Level Literature Searches
- \* Providing general assistance/guidance on implementing systematic review processes
- \* Active collaboration between OPPT/RAD, ORD, OSCP

- \* SOPs for conducting an IRIS assessment using systematic review
- \* Intra-agency review
  - March 30: Presentation and discussion
    - Decision made to remove the Chapter 10 Hazard ID framework from the initial public release (for both cancer and non-cancer)
  - April 28: Due date for comments on other major issues
  - May 9<sup>th</sup>: A follow-up meeting with a subgroup of intra-agency partners to mock up alternative text for characterizing hazard
- \* Interagency presentation and discussion
  - Session 1: Tuesday, May 23 from 10:00 AM -11:30 AM (EST)
  - Session 2: Tuesday, May 30 from 9:30 AM -11:00 AM (EST)
- \* STPC June 21 presentation (IRIS handbook + other)
- \* Hopeful for public release this summer....

- Presentations and training on HERO, tools to help conduct rapid literature surveys, priority-ranking studies for relevance during screening, data extraction and visualization

HAWC  
*Data Extraction &  
Visualization*  
April 12 (Seminar)  
May 16 (Hands on  
Session)

SWIFT Review/SWIFT  
Active  
*Problem Formulation &  
Priority Ranking*  
April 25 (Seminar)  
April 27 (Hands on Training)

HERO  
*Scientific Literature  
Database*  
March 13 (Seminar)  
April 26 (Seminar)

- Focus on scoping and problem formulation, define user needs, and frame the scientific questions prior to draft development
  - Products from large/complex assessments may be modular
  - Typical length 10-20 pages
- Described the type of evidence considered relevant to address specific aims
  - Defined through a “PECO” statement (Populations, Exposures, Comparators, and Outcomes)
- Draft assessment plans will be presented for scientific and public input (September SAB CAAC meeting)

- Currently developing 3 draft assessment plans targeted for September SAB consolation
  - Methyl mercury
  - Nitrates/nitrites
  - Ethylbenzene (presented as an update to prior public scoping and problem formulation discussion)
- May: Share with most invested Programs and Offices
- Mid-June: Interagency dissemination
- Mid-August: Public posting



## Updated Health Assessments (UHAs)

- Targeted reviews that can be conducted within 6-9 months
  - Letter peer-review (with opportunity for public comment)
- Pilot case examples
  - Uranium (oral)
  - Chloroform (inhalation)
  - Manganese (adult, neurological)
  - Ammonia (oral)
- Solicit SAB CAAC input on the update/letter-review process, not peer-review of the technical assessment
- Moving forward, propose to do several UHAs annually



## Updated Health Assessments (UHAs), cont.

- June: Share drafts with key Programs and Offices
- Mid-July: Interagency review
- Mid-August to end September: Public comment period
- September to early October: Letter-peer review

Thayer HHRA IRIS Update (May 9, 2017)



## Upcoming Activities in Q3 & Q4

May	June-July	July	August	September	October	November
ETBE: Step 4*	FA: Begin Agency Review	ETBE: Step 4 Pre-Face Teleconference *	ETBE & TBA: Face-to-Face SAB Peer Review Meeting*	SAB CAAC: Face-to-Face Consultation Meeting to UHAs and IAPs to review examples of products from chemical evaluation products		EPA BOSC: In person public meeting of the EPA Board of Scientific Counselors (BoSC)
TBA: Step 4*		TBA: Step 4 Pre-Panel Teleconference *	UHA: Release of Updated Health Assessments (UHA)*			
SAB CAAC: Briefing Conference Call with EPA SAB CAAC to present an overview of these updates to the IRIS Program			IAP: Release of IRIS Assessment Plans (IAP)			

\*Anticipated Activities





## Topic 2: Integrated Science Assessments (ISA) and Scientific/Regulatory Support

- Project 3 (HHRA 2.21) - ISAs and Scientific/Regulatory Support

PL Steve Dutton, NCEA RTP

- Task 3.1 (HHRA 2.211): Development of ISAs

TL Steve Dutton, NCEA RTP

- Recent releases

- Task 3.2 (HHRA 2.212): ISA-Related Scientific & Regulatory Support

TL James Brown, NCEA RTP

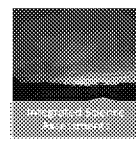
- Feature: *"The Many Facets of Lead ISA Applications in the Agency"*

- Task 3.3 (HHRA 2.213): ISA-Related Science Advancements

TL Jennifer Richmond-Bryant, NCEA RTP

- HHRA PACT #2: "ISA PACT"

- Weekly meetings with OAQPS; monthly with others as needed



★★★★★  
"A five-star process for incorporating science into regulatory policy."  
Administrative Conference of US (2013)

- **Project 4: Provisional Peer-Reviewed Toxicity Value (PPRTV) Assessments**

PL: Teresa Shannon, NCEA CIN / TL: J. Phillip Kaiser, NCEA CIN

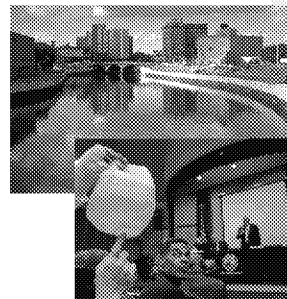
- Annually develop  $\geq 12$  PPRTV assessments as prioritized by OLEM.
  - Derived following a review of the relevant scientific literature using the same methods, sources of data, and guidance used by the IRIS program
  - All PPRTV assessments receive internal review by EPA scientists and external peer review by independent scientific experts.
- Status FY17 Q2
  - pCBA (para-chloro benzene sulfonic acid)
    - Chronic and subchronic oral RfD
  - Now 335 PPRTV assessment documents available online which provide 799 values
  - On target to deliver all in FY17 and FY18 already in process
- FY17: Continued application of new approaches in appendices as characterization and understanding matures





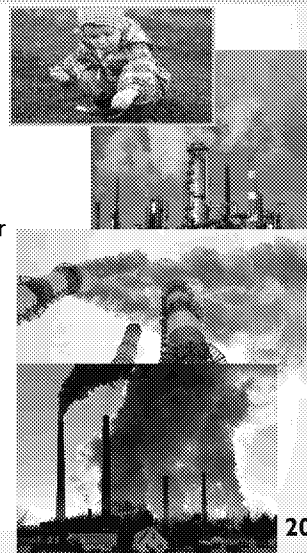
## HHRA Project 5 (HHRA 3.22): Site-specific and Superfund Regulatory Support

- Project 5 PL: Teresa Shannon, NCEA CIN
- **Provides technical support, consultation and reviews for Superfund and other Agency priorities**
  - Task 5.1 (HHRA 3.221) **Quarterly reports to Superfund Technical Support Center (STSC) and Ecological Risk Assessment Support Center (ERASC)**
    - TL Teresa Shannon, NCEA CIN
      - FY17Q1 and FYQ2 delivered
  - Task 5.2 (HHRA 3.222) **Technical consultation and support on Agency priorities**
    - TLs Beth Owens, NCEA CIN and Linda Phillips, NCEA W
      - Region 5, Manganese: Consultation to Region 5 regarding best exposure levels (reference values) to use for an enforcement action under consent decree that mandated fence-line monitoring at a facility in East Liverpool, OH
      - 5.2.2.1 RARE project on sampling methods for PCBs in indoor air - Sampling completed and contract for conducting sampling is closed with the delivery of a final report, now housed in ORD and Region 2. Three efforts are now underway to assess the data and craft two or more manuscripts on the data. There are no plans to finalize the report as an EPA report.
      - 5.2.2.3 Technical Support for the PCBs in Schools and Other Sites – NCEA continues to provide technical support for PCBs in Schools and other sites, by responding to questions from the program offices and regions on the PCB Exposure Estimation Tool and its potential use in developing site-specific exposure levels for evaluating PCBs in indoor school air.
      - Reference Value Arrays are being drafted or updated for three chemicals (benzene [update], hydrogen chloride, and nickel); work anticipated to be completed by end FY17



- **Participation on Agency workgroups**

- Soil and dust ingestion: NCEA W consultation on exposure factors in collaboration with SHC
- OAQPS, n-Propyl Bromide (nPB): NCEA RTP Staff participated as a member of the nPB HAP-Listing Work Group convened by OAQPS
  - n-PB will be the first chemical to be added to the list of Hazardous Air Pollutants (HAPs) since the Clean Air Act 1990 amendments
  - On December 28, 2016, the US EPA issued a draft notice of the Agency's rationale for granting petitions to add nPB to the list of HAPs
- OAQPS, Risk and Technology Review (RTR) Program: NCEA RTP staff participates as work group members on a number of RTR, source-category specific regulatory actions, working collaboratively with ORD/OSP to provide an ORD-wide perspective.
  - 33 new source categories will require a review by 2020



- **PACT Meetings**

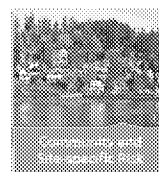
- Bi-monthly meetings with OLEM
- Bi-monthly meetings with OHHRRAF

- **Standard Operating Procedure (SOP) for chemical selection**

- Finalized October 2016 and delivered to OLEM
- Developed to codify and clearly define the process
- Increases interaction with OLEM HQ and the Regions to include scoping team
- Breaks chemical selection into two categories:
  - Standard annual process
  - “Fast-track” requests from Regions via the STSC

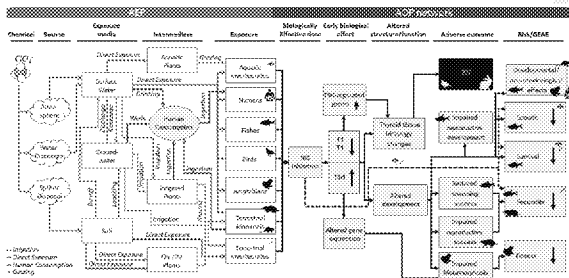
- **Status FY17 Q2:**

- 1<sup>st</sup> Call for chemicals (January 2017) to OLEM, OSRTI and ORD STL
- Scoping team will meet in March 2017 to identify and prioritize FY19 candidates



- PLs Mike Wright, NCEA CIN / Deborah Segal, NCEA W
- Task 6.1 (HHRA 3.231): **Approaches to cross-species data integration to support CRA** TL Meredith Lassiter, NCEA RTP

- Case studies illustrating utility of AEP:AOP frameworks to integrate human and ecological endpoints (e.g., the ES-GEAE) and advance mechanistic considerations
- SOT 2017 RASS Best Abstract Award – Poster (Abstract # 2827 / Poster # P229) David Hines et al. *Cross-species integration of human health and ecological endpoints using the Aggregate Exposure Pathway (AEP) and Adverse Outcome Pathway (AOP) frameworks to advance risk assessment*

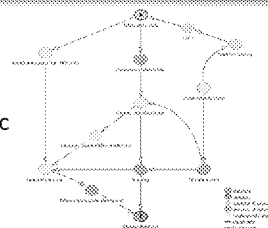


Perchlorate AEP:AOP conceptual model for integration of human health and ecological endpoints into CRA

## • Task 6.2 (HHRA 3.232): Incorporating Multiple Stressors

TL Glenn Rice, NCEA CIN

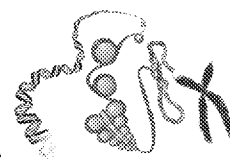
- Publication: Brewer LE; Wright LM; Rice G; Neas L; Teuschler L. (2017). Causal inference in cumulative risk assessment: The roles of directed acyclic graphs. *Environ Int*, May 102, 30-41. doi: 10.1016/j.envint.2016.12.005. Epub 2016 Dec 14.



## • Task 6.3 (HHRA 3.233): Applying Genetic and Epigenetic Data to Inform Susceptibility TL Sue Euling, NCEA W

### – Applying Epigenetics Data to Cumulative Risk

- **Human Study:** Nonchemical Stressors, Epigenetic Changes, Susceptibility to Air Pollution Exposure, and Cardiovascular Disease (HHRA, ACE, and SHC Collaboration with NHEERL on Duke CATHGEN project): Methylated DNA sample analysis underway



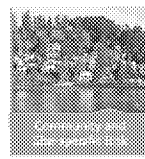
### – Applying Polymorphism and Mechanistic Data to Inform Genetic Susceptibility

- **Approach and Case Study:** Use AOP Framework and Select Relevant and Data Rich AOP for Case Study: End FY17

- Task 6.4 (HHRA 3.234): **Apportioning Multimedia Exposure and Risk Across Human and Ecological Receptors**

TL Jennifer Richmond-Bryant, NCEA RTP

- One of top 5 Abstracts Award by Mixtures Specialty Section (MixSS) at the SOT 2017: Poster (Abstract # / Poster #: 3536/P511) Reyes J and Price P. *An analysis of cumulative risks indicated by biomonitoring data of six phthalates using the maximum cumulative ratio*
- OTHER UPDATES?

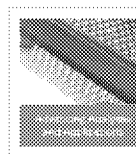






## Topic 4: Advancing Analyses and Applications

- Topic 4 Leads: David Bussard / Scot Hagerthey (NCEA W)
- Project 7 (HHRA 4.21) **Advancing Hazard Characterization and Dose-Response Methods**  
PLs Allen Davis, NCEA CIN / Andrew Kraft, NCEA W
  - Task 7.1 (HHRA 4.211) **Advancing Methods for Systematic Review and Evidence Integration**  
TL Molini Patel, NCEA RTP
    - Any update for Q3?
  - Task 7.2 (HHRA 4.212) **Advancing Quantitative Methods** TLs John Fox, NCEA W / Karen Hogan, NCEA IRIS
    - Any update for Q3?
  - Task 7.3 (HHRA 4.213): **Advancing Methods for Benefits and Uncertainty Analyses** TLs Todd Blessinger, NCEA W / Tom Bateson, NCEA W
    - Any update for Q3?
  - Task 7.4 (HHRA 4.214): **Characterizing Determinants of Risk: Concentration, Duration and Timing of Exposure** TLs Andrew Hotchkiss, NCEA RTP / George Woodall, NCEA RTP
    - Any update for Q3?



- **Project 8 (HHRA 4.22) Applying Emerging Science to Inform Risk Screening and Assessment**

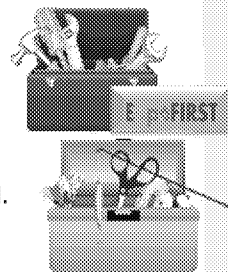
PLs John Stanek, NCEA RTP / Jay Zhao, NCEA CIN

- Exposure factors handbook updates – Internal review of the revised Chapter 5 (soil and dust ingestion) of the Exposure Factors Handbook was completed. An external review draft has been prepared and will undergo peer review during April/May.
- Eco-Box – The internal review period has officially ended. Currently addressing internal review comments. No release date yet since new websites are on hold. Linda Phillips will be doing a webinar on Eco-Box for the ERAF in mid-May.
- Food consumption rates tool – Internal review of the test site has been completed. External peer review is expected in May.

- **Project 9 (HHRA 4.23) Risk Assessment Support and Training**

PLs Maureen Johnson, NCEA IO) / Reeder Sams, NCEA RTP

- Launching 3 web-based RATE modules by end FY17



## HHRA PACT Discussion: Status



- “Launch” briefings completed in September 2016
- Preliminary list of PACT members identified by Programs/Regions
  - Identified project area(s) of general interest, or specific tasks
- Stand up of PACTs
  - Discussion of possible opportunities (e.g., briefings/updates, reviews, details)
  - Seek refinement on nature of collaborations
    - Specify skill sets
    - Elaborate on interests
  - Develop and implement PACT engagement
    - Obtain project and management commitment